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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,375	01/04/2002	Jae Hong Kim	30205/37916	9238

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EXAMINER

SARKAR, ASOK K

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 02/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

10/038,375

Applicant(s)

KIM ET AL.

Examiner

Asok K. Sarkar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 January 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other:

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's arguments with respect to claims 1 – 13 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 – 3 and 6 – 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Avanzino, US 5,916,855.

Regarding claim 1, Avanzino teaches a polishing slurry consisting essentially of (see column 3, lines 62 – 65) an oxidant (oxidizing agent) ceric ammonium nitrate (column 8, line 35) and abrasives containing essentially of inorganic particles in column 4, lines 1 – 4.

Regarding claim 2, Avanzino teaches slurry comprising an acid in column 8, lines 34 – 35.

Regarding claim 3, Avanzino teaches oxidizing agent present within the range of 1 – 10 wt% in column 7, line 43.

Regarding claims 6 – 8, Avanzino teaches slurries made of  $\text{Al}_2\text{O}_3$  and  $\text{CeO}_2$  in column 4, lines 1 – 3, size of abrasives below 1 micron in column 4, line 19 and amount of 1 – 5 wt% in column 7, line 17.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 5 and 9 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Avanzino, US 5,916,855 in view of Chopra, US 6,419,554.

Regarding these claims Avanzino teaches organic acids and salts in column 11, lines 1 – 5 but fails to teach a slurry containing acids such as HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, HCl or H<sub>3</sub>PO<sub>4</sub> with pH control and comprising a buffer solution.

Chopra teaches a CMP slurry with a fixed abrasive pad, which can also be a non abrasive pad (see column 1, lines 22 – 39) where the slurry contains an oxidizer, an acid such as H<sub>3</sub>PO<sub>4</sub> (see column 2, line 58) in the amount ranging from 1 – 10 wt% in column 3, line 39, pH of 1 – 7 in column 3, lines 56 – 58, buffering solution of organic acid and organic acid salt such as ammonium acetate in column 3, lines 53 – 65.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Avanzino's slurry by the teachings of Chopra and design a CMP slurry for non abrasive pad which contains an acid, a buffer solution consisting of an organic acid and salt and a pH between 1 – 7 so that the slurry is better suited for polishing TiN film.

***Conclusion***

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6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 703 308 2521. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703 308 1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 4918.

Asok K. Sarkar  
February 3, 2003



**KAMAND CUNEO**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**